

# EXHIBIT 4

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**UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA**

TERADATA CORPORATION,  
TERADATA US, INC., and TERADATA  
OPERATIONS, INC.

*Plaintiffs,*

v.

SAP SE, SAP AMERICA, INC., and SAP  
LABS, LLC

*Defendants.*

Case No. 3:18-CV-03670-WHO

**AMENDED EXPERT REPORT OF PROFESSOR JOHN ASKER**

April 19, 2021

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**HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY****2. SUMMARY OF OPINIONS**

8. After my initial report was filed on March 29, 2021, I learned that the Plaintiffs produced an updated version of their revenue data which I considered to form my opinions. I am filing this amended report which replaces their previously produced revenue data with the updated version. This updated production does not change any of my opinions filed on March 29, 2021. A summary of my main opinions to date in this matter is as follows.

**9. The relevant antitrust product market for the tying product is core ERP products for large enterprises; the relevant geographic market is global.** The parties’ documents and testimony, industry reports, and the available data all support this relevant antitrust market definition. Core ERP products are identified with reference to the finance modules of ERP software. They contain those functions around which other ERP features are built.<sup>2</sup> Given the specific needs of large enterprises, ERP products outside of this relevant market are not reasonably interchangeable with SAP’s core ERP product for large enterprises, which is contained within SAP’s S/4HANA. I apply standard methods to the information on the record and the available data to assess this relevant market and find that it meets the requirements of a relevant antitrust market. See Section 5.2.

**10. The relevant antitrust product market for the tied product is EDW solutions with OLAP capabilities for large enterprises; the relevant geographic market is global.** The parties’ documents and testimony, industry reports, and the available data all support this relevant antitrust market. Although there are a wide variety of analytics products and database products available from a variety of vendors, many of these products are not reasonably interchangeable with SAP’s HANA product and Teradata’s products because they are used for different purposes or at different scales. I apply standard methods to the information on the record and the available data to assess this relevant market and find that it meets the requirements of a relevant antitrust market. See Section 5.3.

**11. SAP has market power in the tying market.** SAP has maintained a high market share, high profit margins, and high profitability over time in the tying

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<sup>2</sup> ERP software tends to have bespoke elements that make every installation at a company somewhat different from any other. This is hardly surprising, as every company has its own specific needs. Core ERP products contain the elements of ERP software that form a common skeleton, upon which the rest of an installation is built. The finance modules are central to this common skeleton and are used as an identifying reference point, so as to allow the analysis of competition to be appropriately focused. See Section 5.2.1.

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market. Despite high profitability, the tying market has not attracted successful entry because of high barriers to entry, including high switching costs for customers. See Section 6.

**12. SAP’s tying conduct is harming competition in the tied market.** SAP’s conduct and the facts in this case align with conditions provided in the economics literature under which a tie harms competition. In this case, the data and documents indicate that SAP’s tie is causing sales of HANA that otherwise would not have occurred. That is, SAP’s conduct distorts purchasers’ choices of EDW products, which harms purchasers and competitors competing for those sales. SAP has gained a significant share of the relevant large enterprise EDW market by selling primarily to its large installed base of ERP customers. I have considered whether there is information in the record that would indicate to an economist that consumer benefits exist, specific to the tie, that would be likely to offset any competitive harm arising from the tie. While I am mindful of the limits of my expertise as an economist in evaluating the design and engineering aspects of the software at issue in this matter, I have not seen market outcomes that would indicate such an offsetting pro-consumer benefit. See Section 7.

**13. SAP’s tying conduct is harming Teradata.** Given the characteristics of the industry at issue, including the lengthy contracting cycles and the cost and disruption arising from upgrading or replacing software, only a portion of the expected adoption of S/4HANA has occurred by the end of the available data (through 2019 for SAP data and through 2020 for Teradata data). I expect that the majority of the harm from SAP’s conduct will happen in the future. The available data and documents indicate that this harm will be substantial, with almost half of Teradata’s average annual revenue at risk.<sup>3</sup> The available data and documents also indicate that Teradata has already been harmed by SAP’s conduct due to lost revenues from customers impacted by the tie. Based on standard econometric methods and using conservative assumptions, I find that SAP’s conduct has caused Teradata to lose profits of [REDACTED] through 2020. I estimate future damages due to the loss of revenue from Teradata’s existing customers of approximately [REDACTED] (this estimate does not include losses from potential future customers due to SAP’s conduct). See Section 8.

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<sup>3</sup> See ¶ 20.

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than Gartner’s estimate of Snowflake’s share (0.2 percent), for example. Moreover, I note that Gartner’s ranking of top providers of “relational databases” has remained essentially constant over the 2015–2018 period, with Amazon being the only provider that has moved into the top ranks.<sup>386</sup> As discussed in Section 5.3, Amazon does offer data warehousing and analytics services, but it does not compete for the same large enterprise data warehouse workloads for which Teradata and SAP compete.

***7.2. Potential procompetitive justifications for SAP’s conduct are not supported by the data or documentary evidence***

169. The economics literature has considered the conditions under which tying and bundling can be efficiency-enhancing and procompetitive.<sup>387</sup> In this section, I consider whether those conditions are met in this case. Based on the documents, data, and testimony that I have reviewed, I do not see any indication that SAP’s tying conduct is procompetitive.

170. SAP’s integration of its ERP application with its HANA database is advertised as a benefit to purchasers due to reduced complexity, computation time, and cost.<sup>388</sup> Reduced costs and increased quality are procompetitive justifications for tying and

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<sup>386</sup> See workpaper 11.

<sup>387</sup> David S. Evans and Michael Salinger, “Why Do Firms Bundle and Tie? Evidence from Competitive Markets and Implications for Tying Law,” *Yale Journal on Regulation*, 22(37), 2005, pp. 37–89; Nalebuff (2003).

<sup>388</sup> Defendants’ Second Amended Responses and Objections to Plaintiffs’ Sixth Set of Interrogatories No. 48, December 3, 2020, pp. 10–11 (“S/4HANA’s transactional and embedded analytical capabilities could not have been realized if S/4HANA had been developed to accommodate less powerful and less efficient third-party databases ... From the customer’s perspective, the simplicity of S/4HANA drives value across the business. For example, a business user is able to render better decisions based on more complete and timely information. Specifically, business users are able to conduct transactions, access and analyze the data resulting from those transactions, and predict outcomes at speeds that were never thought possible before S/4HANA ... In addition, the user interface is more intuitive and has fewer screens thereby focusing on the user and their role-specific needs. The total cost of ownership is also reduced by allowing businesses to reduce their overall data footprint, reducing data distribution to data warehouses for operational analytics and reducing the overall amount of database work that has to be done to ensure the integrity and usability of the data”); SAP, “Features and business benefits of SAP S/4HANA,” available at [www.sap.com/products/s4hana-erp.html](http://www.sap.com/products/s4hana-erp.html), accessed on February 24, 2021 (“50% reduction in data footprint due to in-memory, columnar database ... 100 times faster reporting ... Real-time advanced analytics.”)

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bundling.<sup>389</sup> An example in which a bundle can reduce costs is automobiles, which the manufacturer can assemble at a lower cost than the typical customer could if it bought the components individually and assembled the automobile itself. An example of increased quality might be computers and operating systems: the user might receive a higher-quality product when purchasing the computer if it comes tied to an operating system that is designed to take advantage of the specific capabilities of the computer hardware, and those benefits would not be realized if a third party or end user were to install the operating system post-purchase.<sup>390</sup>

171. SAP states in its responses to interrogatories that bundling S/4HANA with HANA results in additional transactional and embedded analytical capabilities and reduces total cost of ownership.<sup>391</sup> While I do not have the expertise to evaluate whether there is a technical benefit from combining S/4HANA with HANA, what I have seen in the available data and documents is consistent with adoption of S/4HANA and HANA not being driven by these purported benefits.<sup>392</sup> In addition, if the benefits of the tie were real, then one would expect that S/4HANA and HANA would have been successful outside of SAP’s installed base of customers. The documents and data indicate that is not the case. [REDACTED]

[REDACTED]  
[REDACTED].<sup>393</sup> After being tied to S/4HANA, HANA sales

<sup>389</sup> Nalebuff (2003) at pp. 31–33. Barry Nalebuff, “Bundling as an Entry Barrier,” *The Quarterly Journal of Economics*, 119(1), 2004, pp. 159–187 at p. 161 (“An obvious explanation for many bundles is that the company can integrate the products better than the customer can.”)

<sup>390</sup> In the retail computer industry, for instance, it seems reasonable to suppose that the typical end user could not reliably install an operating system on their own.

<sup>391</sup> See footnote 388.

<sup>392</sup> McStravick June 2017 Database & Data Management Business Review at SAP\_01325982 [REDACTED]

[REDACTED]  
[REDACTED]; email chain from Alexander Boehm to Theresa Voecking and Bare Said, [REDACTED]

<sup>393</sup> [REDACTED]  
[REDACTED]



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increased.<sup>394</sup> [REDACTED]  
[REDACTED],<sup>395</sup>

Moreover, much of the discussion of the growth of HANA sales in SAP’s documents does not tie that growth to HANA’s purported benefits, but instead to SAP’s success in converting its ERP installed base to HANA (see Section 7.1.1). [REDACTED]

[REDACTED],<sup>396</sup> [REDACTED]  
[REDACTED],<sup>397</sup> [REDACTED]

[REDACTED]  
[REDACTED].<sup>398</sup> All of these factors

are contrary to what I would expect to see, as an economist, if the tie were resulting in sizable benefits above and beyond the benefits of, say, combining HANA with a legacy SAP ERP platform.<sup>399</sup>

172. Further, any claimed efficiencies from the tie appear unrelated to the implementation of the tie using the differential restrictions of the “runtime” and “full use” licenses.<sup>400</sup> The restrictions imposed by the “runtime” license and the relaxation of those restrictions by the “full use” license indicate to me, as an economist, that the restrictions imposed by the runtime license are unrelated to any ability to realize efficiencies related to the tie.

173. An additional possible procompetitive justification for tying and bundling is that it can be used to reduce pricing inefficiencies.<sup>401</sup> However, given that SAP can and does price discriminate (see Section 5), this justification is not relevant in the current setting. SAP’s flexibility in pricing indicates that any potential pricing inefficiencies

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<sup>394</sup> HANA was broadly available in mid-2011. [REDACTED]

[REDACTED]. See workpaper 31.

<sup>395</sup> See Exhibit 11

<sup>396</sup> See footnote 62.

<sup>397</sup> See footnote 39.

<sup>398</sup> See footnote 30, footnote 55, and footnote 56.

<sup>399</sup> Because S/4HANA has only been sold with HANA (a feature of the environment that was within SAP’s control), I lack the variation in the data needed to support this discussion quantitatively. In an ideal world, data on the performance of S/4HANA and HANA with and without the tie would be available, but SAP chose never to sell S/4HANA absent the tie. Hence, I base my opinions here on qualitative analysis.

<sup>400</sup> Defendants’ Second Amended Responses and Objections to Plaintiffs’ Sixth Set of Interrogatories No. 48, December 3, 2020.

<sup>401</sup> Nalebuff (2003) at pp. 33–37.

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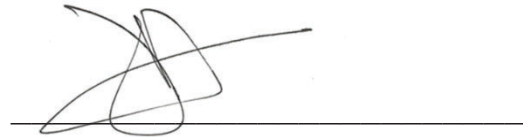
could be addressed in the course of the negotiations with customers during the sales process.

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revenue as in 2020, it would have \$18.36 billion in revenue from 2021 through 2030 (\$14.86 billion when discounted to 2021), \$9.88 billion in gross profit (\$7.99 billion when discounted to 2021), and \$6.70 billion in gross profit after selling expenses (\$5.42 billion when discounted to 2021). This damages estimate is thus 3.5 percent of Teradata’s anticipated discounted revenue, 6.6 percent of discounted gross profit, or 9.7 percent of discounted gross profit after selling expenses.<sup>437</sup>

193. My work is ongoing and I reserve the right to supplement my analysis and conclusions.

Originally executed on the 29<sup>th</sup> of March, 2021 and amended on this April 19<sup>th</sup>, 2021.

A handwritten signature in black ink, consisting of a stylized 'J' and 'A' followed by a horizontal line, positioned above a solid horizontal line.

John Asker

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<sup>437</sup> See workpaper 24.